

Applicant : Shuici Kikuchi et al.  
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Filed : April 10, 2001  
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Attorney's Docket No.: 10417-076001 / F51-  
132533M/SW

REMARKS

Claims 5-27 are pending for further consideration.

The Office action objected to the specification and rejected claim 8 under 35 U.S.C. § 112, par. 2, because the specification refers to regions 11A, 11B, 11C as having a "middle concentration," whereas claim 8 recited a "high" concentration.

Claim 8 has been amended to recite "a middle impurity concentration."

Applicant respectfully requests that the amendment be entered and that the objection to the specification and the rejection of claims 8 and its dependent claims be withdrawn.

Claims 8-18, 20 and 22-27 were not rejected over the prior art and, as indicated at page 5, par. 6 of the Office action, include allowable subject matter.

Claims 5-7, 19 and 21, however, were rejected as anticipated by U.S. Patent No. 5,578,514 (Kwon et al.). As discussed below, applicant respectfully disagrees.

Claim 7 recites "providing a layer of the first conductive type. . . , wherein the layer is disposed above the second drain region." As can be seen in the example of FIG. 4 of the pending application, the layer 6 is disposed over the second drain region 5B.

The Office action alleges (at page 6) that the conductive layer 14 illustrated in the Kwon et al. patent extends to the surface of the substrate and, therefore, is "elevationally over" the first and second drain regions. The Office action appears to be arguing that the conductive layer 14 is higher than the first and second drain regions. That is incorrect.

First, as can be seen from FIGS. 3 and 4 of the Kwon et al. patent, the layer 14 is not higher than the drain regions 24, 36.

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Second, applicant submits that the Office action has misconstrued the phrase "disposed over," which should be interpreted, according to its ordinary meaning and consistent with the written description, to mean "disposed above or on top of."

For at least those reasons, claim 7, as well as dependent claim 19, should be allowable.

Claim 21 recites that the source region is "in direct contact" with the substrate. As can be seen in the example of FIG. 4 of the pending specification, the source 9 is in direct contact with the substrate 1.

The Office action alleges that the source region 34 in the Kwon et al. patent (FIG. 4) is "in contact" with the substrate. That is incorrect. By comparing FIGS. 2-4, it is clear that the source region 34 is formed in the area of the epitaxial layer 14, not in the substrate 12.

For at least that reason, claim 21 should be allowable.

According to pending claim 5, first and second drain regions of different impurity concentrations are formed by diffusing an impurity that was previously implanted in a single implant. Furthermore, diffusion of the implanted impurities occurs during the heat treatment that provides the first gate insulation film.

Although the Kwon et al. patent discloses several regions (14, 24, 36) of the same impurity type and having different impurity concentrations, those regions are separately produced by different implantations requiring multiple steps (see Figs. 1 to 4 and accompanying description in the specification). The layer 14, which itself may be implanted within the substrate, is initially provided as shown in FIG. 1. The drift region 24 and the drain region 36 are subsequently formed using separate implantations.

The Office action states (see final Office action, page 6, par. 7) that the single implant step to form region 23 in FIG. 1 of the Kwon et al. patent is followed by a diffusion drive-in step at an elevated temperature to form region 24 (FIG. 2; col. 3, lines 8-10). The Office action alleges that the drive-in step necessarily would result in two regions having different impurity concentrations as recited in the claim. As discussed below, applicant respectfully disagrees.

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Formation of the region 23/24 in the Kwon et al. patent involves multiple implant steps as follows:

- (1) Formation of the epi-layer 14 itself involves implanting dopants; and
- (2) Additional dopants are implanted in the region 22 (FIG. 1) to form the region 23/24, which constitutes a second implant step.

Therefore, in contrast to pending claim 5, the Kwon et al. patent does not disclose or suggest forming first and second drain regions by a single step of implanting an impurity as recited in claim 5.

In view of the foregoing remarks, applicant respectfully requests reconsideration and withdrawal of the rejection of claim 5, as well as dependent claims 6-7, 19 and 21.

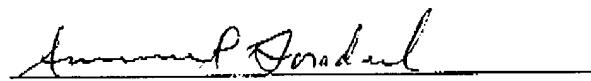
Conclusion

Applicant respectfully requests allowance of the pending claims.

Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 9/27/04

  
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